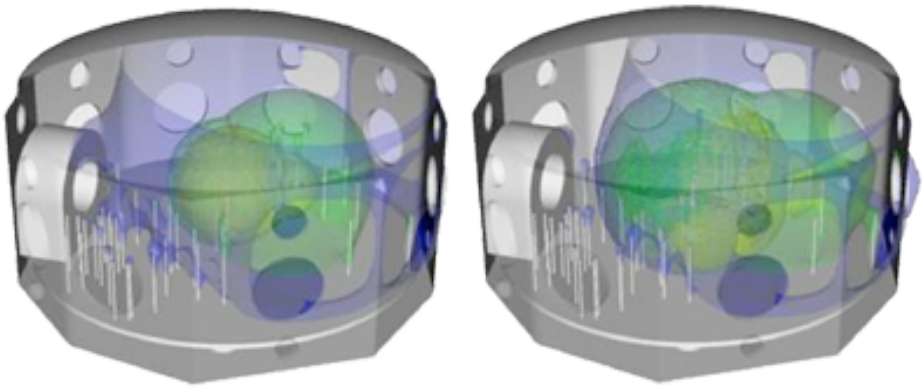
LAWRENCE LIVERMORE
REPORT

A weekly collection of scientific and technological achievements from Lawrence Livermore National Laboratory: Aug. 11-18, 2008.

## NIF teams earns OASCR award for visualization work



**Two frames from the EMSolve simulation of electromagnetic pulses inside the Titan target chamber.**

A team led by Dave Eder of the Laboratory's National Ignition Facility (NIF) received an OASCR (pronounced "Oscar") award at the annual DOE Office of Science -- Scientific Discovery through Advanced Computing (SciDAC) meeting in Seattle.

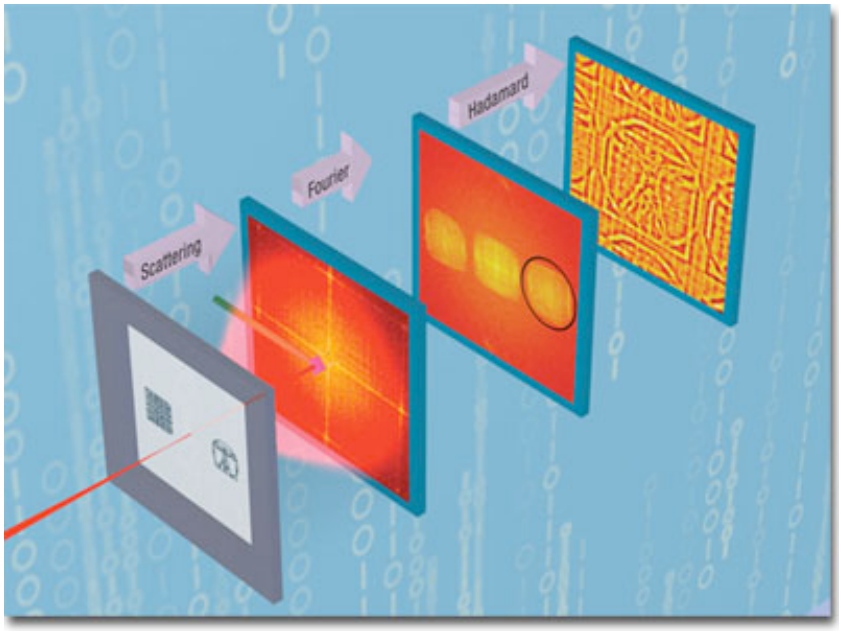
OASCR (Office of Advanced Scientific Computing Research) awards are presented for research visualizations either directly funded by the Office of Science, or created on tools provided by that office. The NIF simulation was made using VisIt software.

Eder's team is working on issues related to electromagnetic pulses (EMP) that result from extremely short but very high-energy laser bursts, such as those that will be created eventually inside the NIF target chamber. Such EMPs can damage delicate electronic diagnostic equipment and result in data loss, even when instruments have been isolated and shielded.

Attendees of the SciDAC meeting were shown 52 different simulations during a special Visualization Night, but only 10 received OASCRs, which were awarded based on votes by the meeting's attendees.

Fore information about the software, go to
https://wci.llnl.gov/codes/visit/home.html

## LLNL researchers image nanoscale materials




**A coherent X-ray beam illuminates a sample and the diffraction patterns create a holograph.**

Lawrence Livermore (LLNL) and Lawrence Berkeley (LBNL) researchers, along with worldwide colleagues, are exploring the use of femtosecond X-ray free electron laser (FEL) pulses for imaging at the nanoscale size at very short timescales.

The lead author, Stefano Marchesini, is a former LLNL researcher who is now at LBNL. Other LLNL scientists include Anton Barty, Michael Bogan, Matthias Frank, Stefan Hau-Riege, Abraham Szoke and former LLNL researchers Sasa Bajt and Henry Chapman, who are now at DESY, in Hamburg, Germany.

As reported online in *Nature Photonics*, the team showed that a uniformly redundant array placed next to the sample, multiplies the efficiency of X-ray transformation holography by more than three orders of magnitude, approaching that of a perfect lens, and provides holographic images with both amplitude and phase-contrast information.

For more information, go to *Nature Photonics*
http://www.nature.com/nphoton/journal/vaop/ncurrent/full/nphoton.2008.154.html

## LLNL scientist garners international award for combustion work


**Charlie Westbrook with the Bernard Lewis Gold Medal**

The Laboratory's Charlie Westbrook has earned the Bernard Lewis Gold Medal for "Brilliant research in the field of combustion, particularly on the pioneering development of detailed chemical kinetic mechanisms for use in practical applications."

Westbrook received the award at the 32nd International Symposium on Combustion held in Montreal earlier this month.

This award is given every two years at the international meeting of the Combustion Institute, and previous recipients include George Kistiakowsky and Y.B. Zeldovich.

“While clearly not in the same ‘league’ as those famous scientists, I was still very gratified by this recognition,” Westbrook said.

The Combustion Institute is an educational nonprofit, international, scientific society whose purpose is to promote and disseminate research in combustion science.

## DOE’s Joint Genome digs into plant-based bofuels

**JGI Director Eddy Rubin stands next to a sample of miscanthus, which can be converted into biofuel.**

Genomics is accelerating improvements for converting plant biomass into biofuel -- as an alternative to fossil fuel for the nation’s transportation needs, reports Eddy Rubin, Director of the U.S. Department of Energy Joint Genome Institute (DOE JGI), in the journal *Nature*.

In the article, Rubin lays out a path for how emerging genomic technologies will contribute to a substantially different biofuels future as compared to the present corn-based ethanol industry -- and in part mitigate the food-vs.-fuel debate.

While Rubin acknowledges that this strategy is in its infancy, rapid progress is being made.

The Joint Genome Institute, supported by the DOE Office of Science, unites the expertise of five national laboratories -- Lawrence Berkeley, Lawrence Livermore, Los Alamos, Oak Ridge and Pacific Northwest -- along with the Stanford Human Genome Center to advance.

For more information, go to http://www.jgi.doe.gov/News/news_8_13_08.html

## Photo of the week

**Stem cell research -- LLNL biologist Sima Bahadori works on a genetic research project involving stem cells. The project uses stem cells from a transgenic mouse model to develop the cell line, which has the capability to be programmed and function as bone and cartilage precursory cells. The goal of the study is to find the potential stem cell's ability to differentiate between bone and cartilage as well as its role to recruit host cells.**

Photo by Jacqueline McBride/LLNL

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